



## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2023-0436; Project Identifier AD-2022-00395-T]

RIN 2120-AA64

#### Airworthiness Directives; The Boeing Company Airplanes

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to adopt a new airworthiness directive (AD) for all The Boeing Company Model 777-200, 777-200LR, 777-300, 777-300ER, and 777F series airplanes. This proposed AD was prompted by a report of a “FLAPS DRIVE” caution message in flight due to the torque trip indicator of the No. 2 trailing edge (TE) flap transmission assembly being in the set position, which resulted in an air turn-back. This proposed AD would require an inspection or records review to determine the serial numbers of the TE flap transmission and gearbox assemblies, and applicable on-condition corrective actions. This proposed AD would also limit the installation of affected parts. The FAA is proposing this AD to address the unsafe condition on these products.

**DATES:** The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to [regulations.gov](https://www.regulations.gov). Follow the instructions for submitting comments.

- Fax: 202-493-2251.

- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

*AD Docket:* You may examine the AD docket at [regulations.gov](https://www.regulations.gov) under Docket No. FAA-2023-0436; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

*Material Incorporated by Reference:*

- For service information identified in this NPRM, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; website [myboeingfleet.com](https://myboeingfleet.com).

- You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2023-0436.

**FOR FURTHER INFORMATION CONTACT:** Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone: 206-231-3548; email: [douglas.tsuji@faa.gov](mailto:douglas.tsuji@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Comments Invited**

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include

“Docket No. FAA-2023-0436; Project Identifier AD-2022-00395-T” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to [regulations.gov](https://www.regulations.gov), including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

#### **Confidential Business Information**

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone: 206-231-3548; email: [douglas.tsuji@faa.gov](mailto:douglas.tsuji@faa.gov). Any commentary that the FAA receives that is not specifically designated as CBI will be placed in the public docket for this rulemaking.

## **Background**

The FAA has received a report of a “FLAPS DRIVE” caution message in flight, which resulted in an air turn-back. Subsequent investigation found that the torque trip indicator of the No. 2 trailing edge (TE) flap transmission assembly was in the set position, which had caused the “FLAPS DRIVE” caution message. The TE flap transmission assembly was removed from the airplane and sent for a teardown inspection to find the cause of the problem. The teardown inspection revealed a broken no-back brake ratchet pawl; the broken piece had lodged itself between the housing and a drive gear, which had resulted in a TE flap transmission assembly lock-up condition. A subsequent Boeing analysis of the broken pawl found that the spring guide pin bore did not meet design requirements. The depth of the pawl bore was more than the specified requirement, and its inner diameter was insufficient. Further, the drawing requirement for the pawl bore inner diameter resulted in an undersized spring guide pin bore, which caused an excessive interference fit between the bore and spring guide, which in turn caused the ratchet pawl assembly to break.

From in-service reports, there have been three known incidents of Model 777 TE flap transmission no-back brake ratchet pawls cracking in service from the same supplier since 2018. The same ratchet pawl part number is used on all eight TE flap transmissions. Historically, these pawls have been fabricated by three different sub-tier suppliers. The three broken pawls were manufactured by the same sub-tier supplier, which is no longer in business. The root cause of the unsafe condition has been determined to be the undersized bores in the suspect pawls causing an interference fit with the mating spring guide pin resulting in increased hoop stresses in the pawl. A review of two inspection reports revealed that the sub-tier supplier had misread the bore requirements.

A broken ratchet pawl assembly, in combination with an upstream torque tube disconnect, can cause failure of the no-back brake to hold flap surfaces in a commanded

position – a condition referred to as flap “blowback.” In addition, a broken ratchet pawl assembly can allow debris in the transmission assembly, which can prevent the pawl from engaging the ratchet plate or cause other damage to the transmission assembly. Both conditions can cause failure of the no-back brake, in combination with an upstream torque tube disconnect, which could lead to uncommanded retraction of the TE flap resulting in asymmetric loss of lift that can affect continued safe flight and landing.

#### **FAA’s Determination**

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

#### **Related Service Information under 1 CFR Part 51**

The FAA reviewed Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023. This service information specifies procedures for an inspection or records review for affected serial numbers of the TE flap transmission and gearbox assemblies at positions 1 through 8. For affected serial numbers, the service information specifies procedures for either (1) removing the TE flap transmission assembly and installing a new or serviceable assembly, or (2) removing the TE flap transmission and ratchet pawl assemblies, inspecting the ratchet pawl assembly for damage and missing material, and, depending on the findings, either installing a new ratchet pawl assembly and a changed TE flap transmission assembly or replacing the ratchet pawl assembly and TE flap transmission assembly with new or serviceable parts. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

## Proposed AD Requirements in this NPRM

This proposed AD would require accomplishing the actions specified in the service information already described. For information on the procedures and compliance times, see this service information at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2023-0436.

## Costs of Compliance

The FAA estimates that this AD, if adopted as proposed, would affect 267 airplanes of U.S. registry. The FAA estimates the following costs to comply with this proposed AD:

### Estimated costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Inspection or records review	1 work-hour X \$85 per hour = \$85	\$0	\$85	\$22,695

The FAA estimates the following costs to do any necessary replacement(s) that would be required based on the results of the inspection or records review. The FAA has no way of determining the number of aircraft that might need these replacements:

### Estimated costs for on-condition actions

Action	Labor cost	Parts cost	Cost per product
Replacement	6 work-hours X \$85 per hour = \$510	\$5,090 per part	\$5,600

## Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress

charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Would not affect intrastate aviation in Alaska, and
- (3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **The Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

### **§ 39.13 [Amended]**

- 2. The FAA amends § 39.13 by adding the following new airworthiness directive:

**The Boeing Company:** Docket No. FAA-2023-0436; Project Identifier

AD-2022-00395-T.

**(a) Comments Due Date**

The FAA must receive comments on this airworthiness directive (AD) by  
[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL  
REGISTER].

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all The Boeing Company Model 777-200, 777-200LR,  
777-300, 777-300ER, and 777F series airplanes, certificated in any category.

**(d) Subject**

Air Transport Association (ATA) of America Code 27, Flight controls.

**(e) Unsafe Condition**

This AD was prompted by a report of a “FLAPS DRIVE” caution message in flight due to the torque trip indicator of the No. 2 trailing edge (TE) flap transmission assembly being in the set position, which resulted in an air turn-back. The FAA is issuing this AD to address a broken ratchet pawl assembly in combination with an upstream torque tube disconnect, which can cause failure of the no-back brake to hold flap surfaces in a commanded position, and possible debris in the transmission assembly, which can prevent the pawl from engaging the ratchet plate or cause other damage to the transmission assembly. The unsafe condition, if not addressed, could result in asymmetric loss of the lift that can prevent continued safe flight and landing.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.



**(g) Required Actions**

Except as specified by paragraph (h) of this AD: At the applicable times specified in the “Compliance” paragraph of Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023, do all applicable actions identified in, and in accordance with, the Accomplishment Instructions of Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023.

Note 1 to paragraph (g): Guidance for accomplishing the actions required by this AD can be found in Boeing Alert Service Bulletin 777-27A0123, Revision 1, dated January 16, 2023, which is referred to in Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023.

**(h) Exception to Service Information Specifications**

Where the Compliance Time columns of the tables in the “Compliance” paragraph of Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023, use the phrase “the original issue date of Requirements Bulletin 777-27A0123 RB,” this AD requires using “the effective date of this AD.”

**(i) Credit for Previous Actions**

This paragraph provides credit for the actions specified in paragraph (g) of this AD, if those actions were performed before the effective date of this AD using Boeing Alert Requirements Bulletin 777-27A0123 RB, dated October 11, 2021.

**(j) Parts Installation Limitation**

As of the effective date of this AD, no person may install, on any airplane, an affected TE flap transmission or gearbox assembly, as identified in Appendix J of Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023, unless the assembly has been inspected and all applicable corrective actions have been performed in accordance with Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023.

**(k) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or responsible Flight Standards Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (l) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the responsible Flight Standards Office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by The Boeing Company Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO Branch, FAA, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

**(l) Related Information**

For more information about this AD, contact Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone: 206-231-3548; email: douglas.tsuji@faa.gov.

**(m) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Boeing Alert Requirements Bulletin 777-27A0123 RB, Revision 1, dated January 16, 2023.

(ii) [Reserved]

(3) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; website [myboeingfleet.com](http://myboeingfleet.com).

(4) You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov), or go to: [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html).

Issued on March 9, 2023.

Christina Underwood, Acting Director,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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